(12) UK Patent Application (19) GB (11) 2 351 116 (13) A

(43) Date of A Publication 20.12.2000

(21) Application No 0009326.0

(22) Date of Filing 17.04.2000

(30) Priority Data
(31) 9908603 (32) 16.04.1999 (33) GB

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(51) INT CL[7]
E04G 3/10

(52) UK CL (Edition R)
E1S SM

(56) Documents Cited
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US 4960185 A US 4421205 A US 3837428 A

(58) Field of Search
UK CL (Edition R) E1S SM
INT CL[7] E04G 3/10
WPI, EPODOC, JAPIO

(54) Abstract Title
Access scaffolding, scaffolding devices and method

(57) A method of installing scaffolding at a vertically extending work-face S. Includes supporting a scaffolding assembly 1, including at least one platform 3 coupled to a carrying cable means Cl and CO, by an upper support means 2. Carrying cable means are located adjacent the side of the work-face by means of at least one holding device 5 attached to the work-face by self-contained force means e.g a magnet or vacuum device and without adaption of the work-face. Also disclosed is a support device 2 provided for this scaffolding assembly.

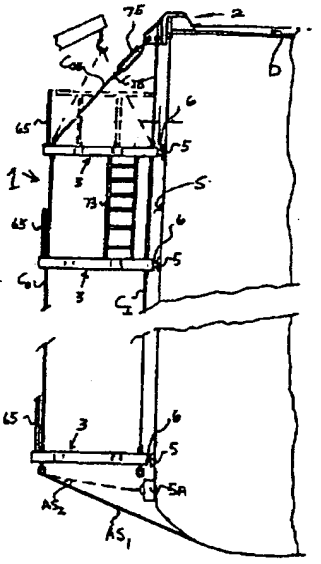

Fig.1A

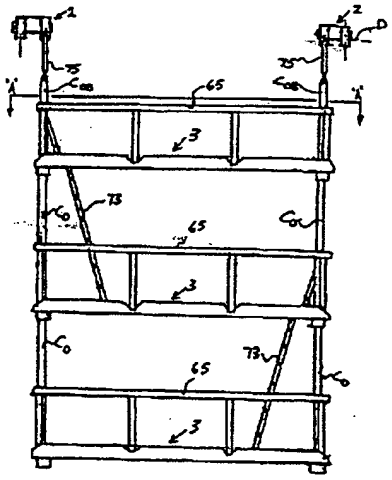

Fig.1B

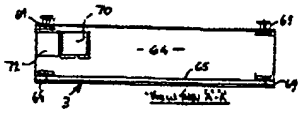

Fig.1C

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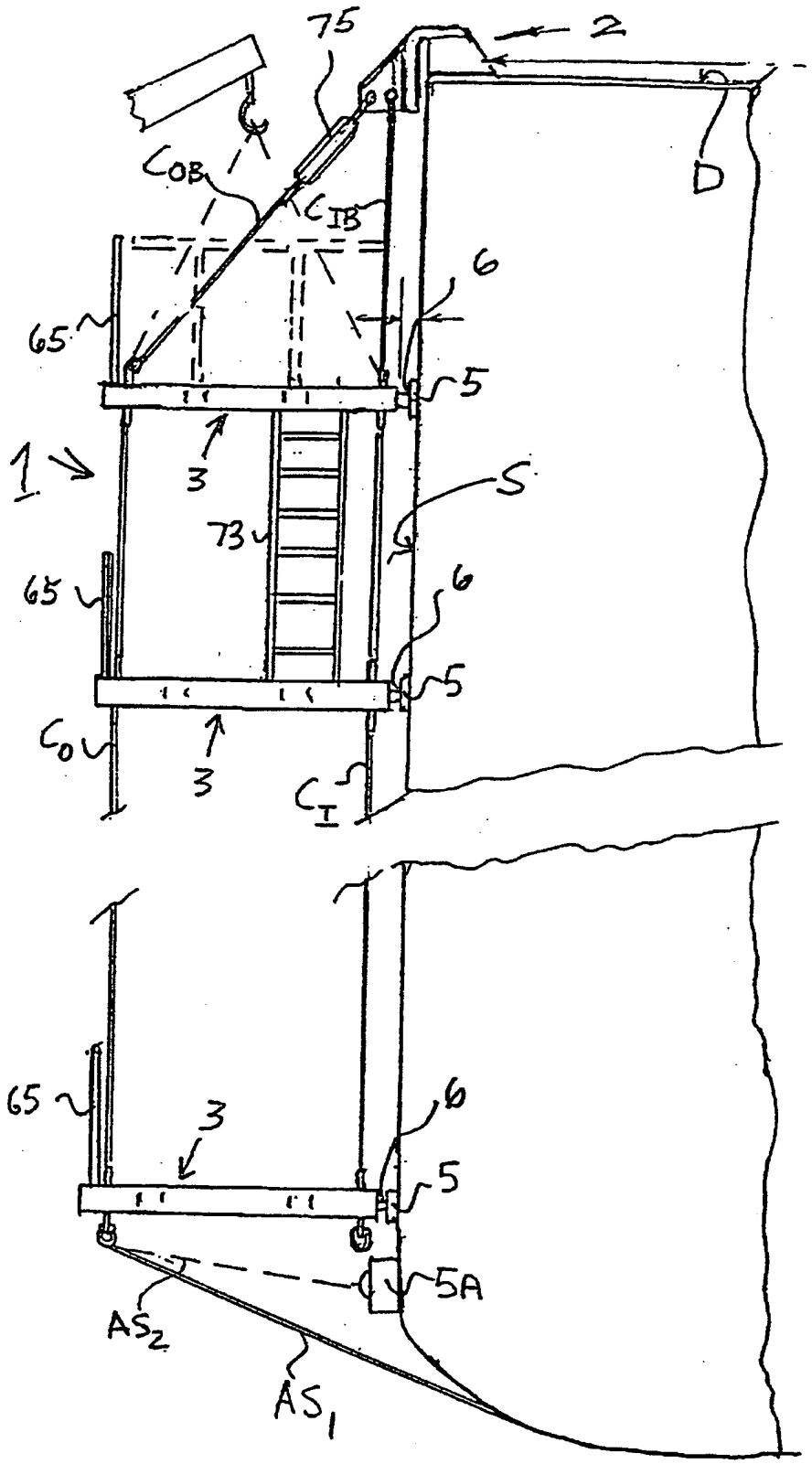


Fig.1A

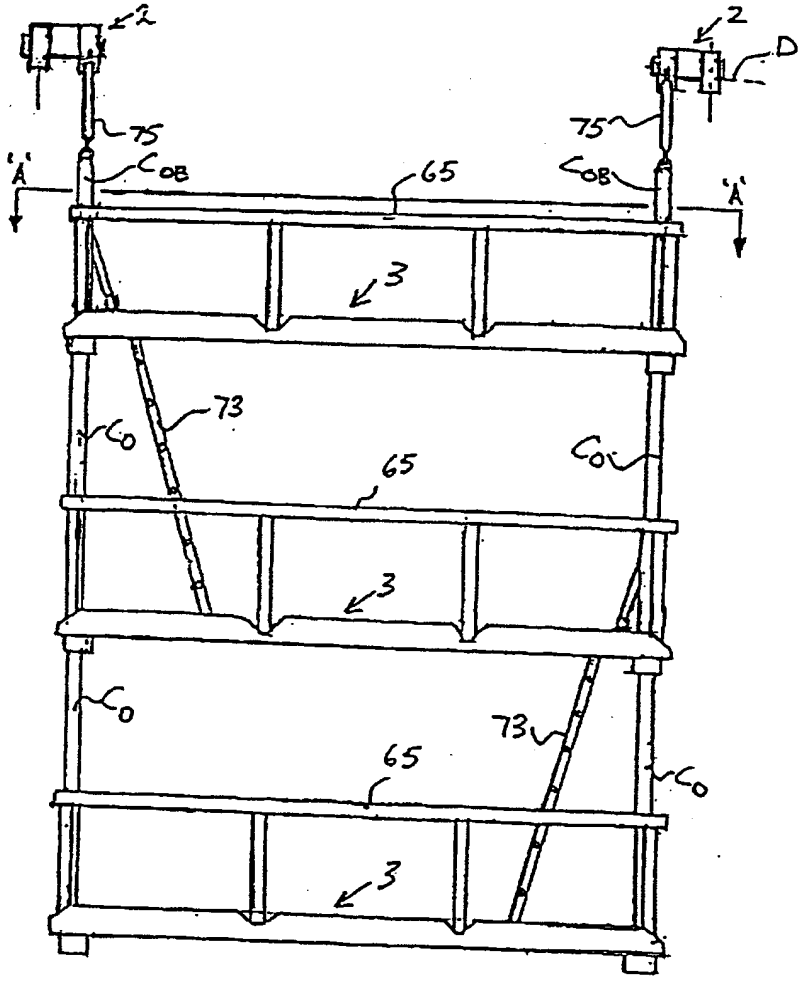


Fig.1B

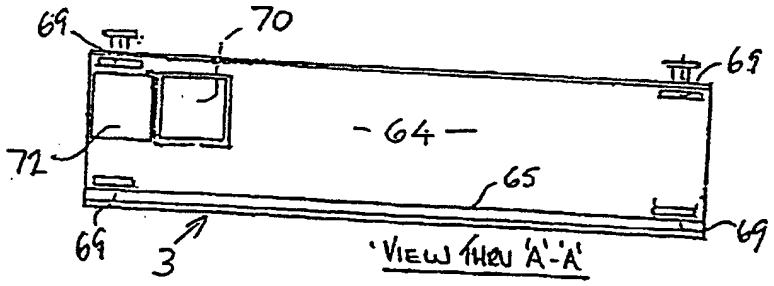
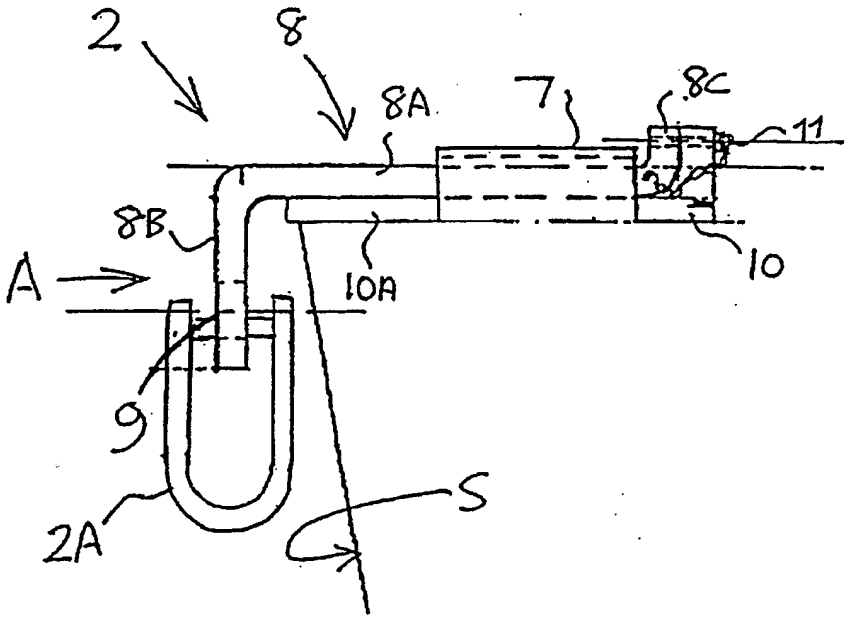


Fig.1C

Fig.2



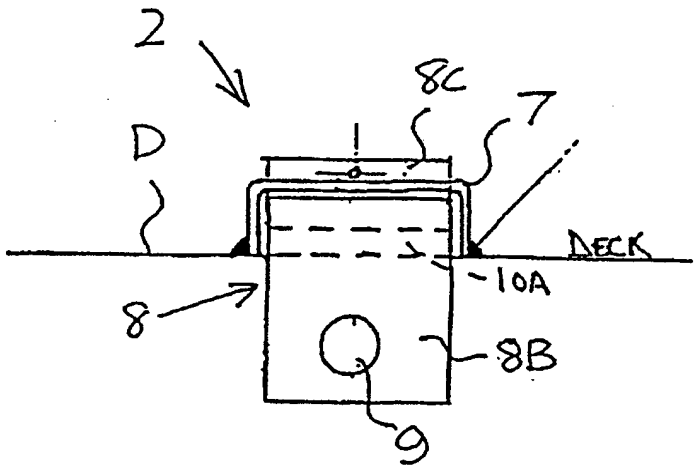


Fig.3

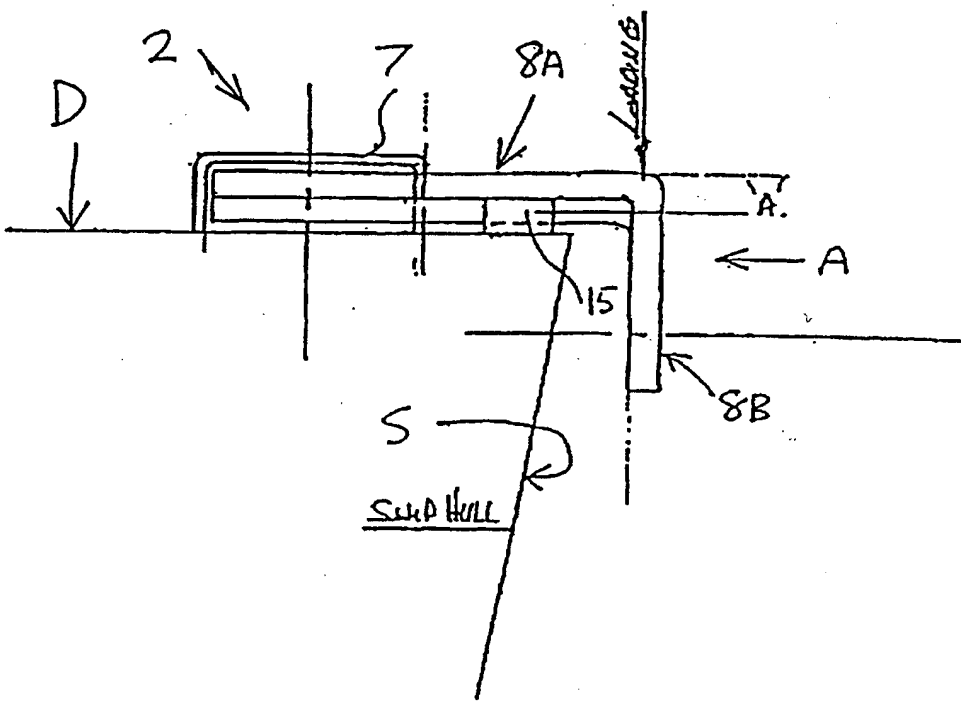
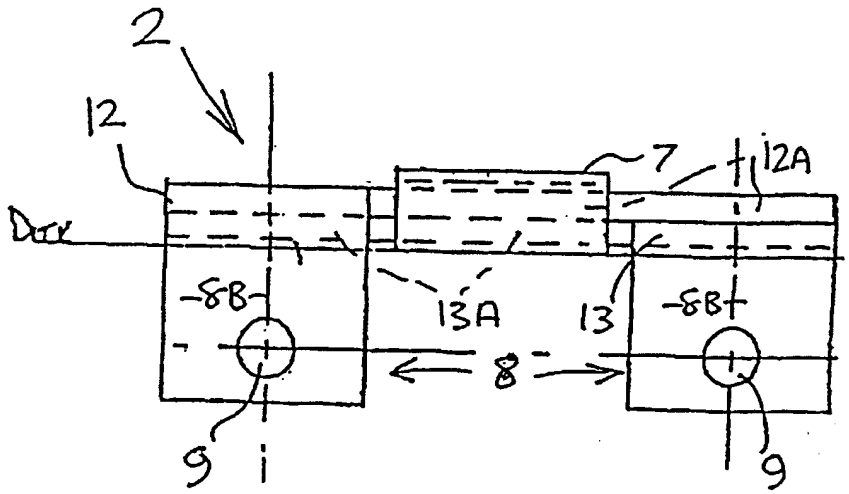


Fig.4

Fig.5



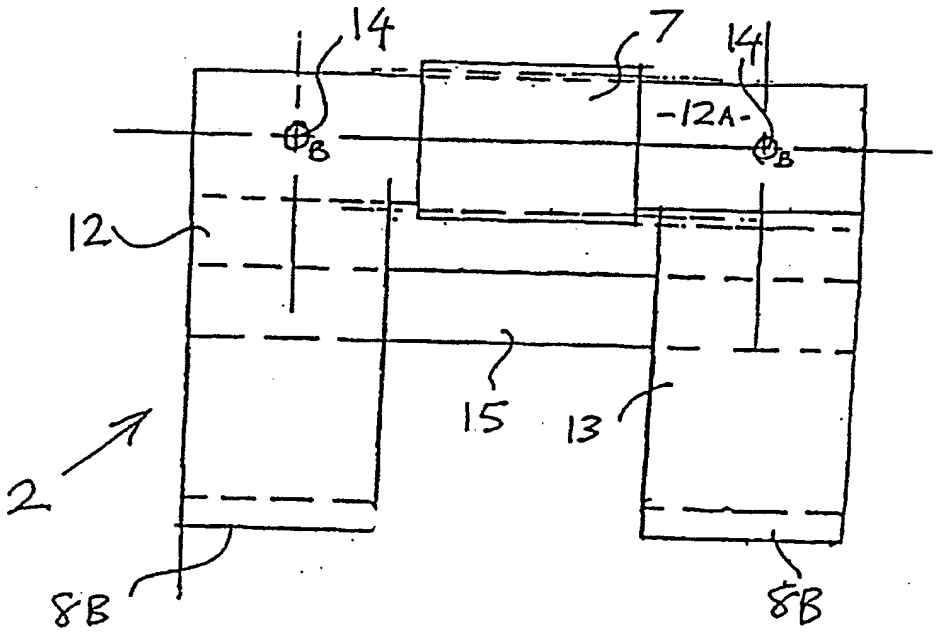


Fig.6

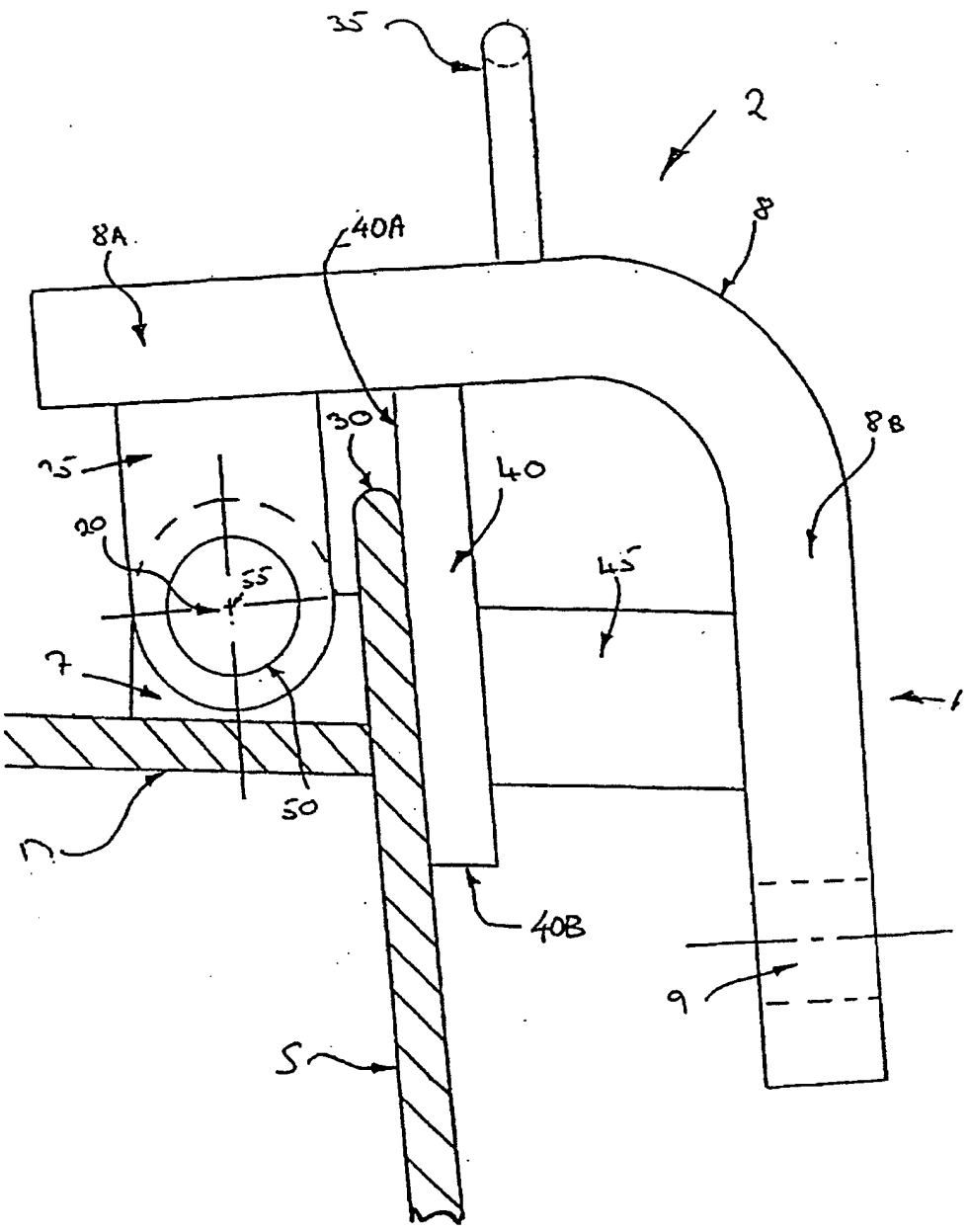


Fig.7

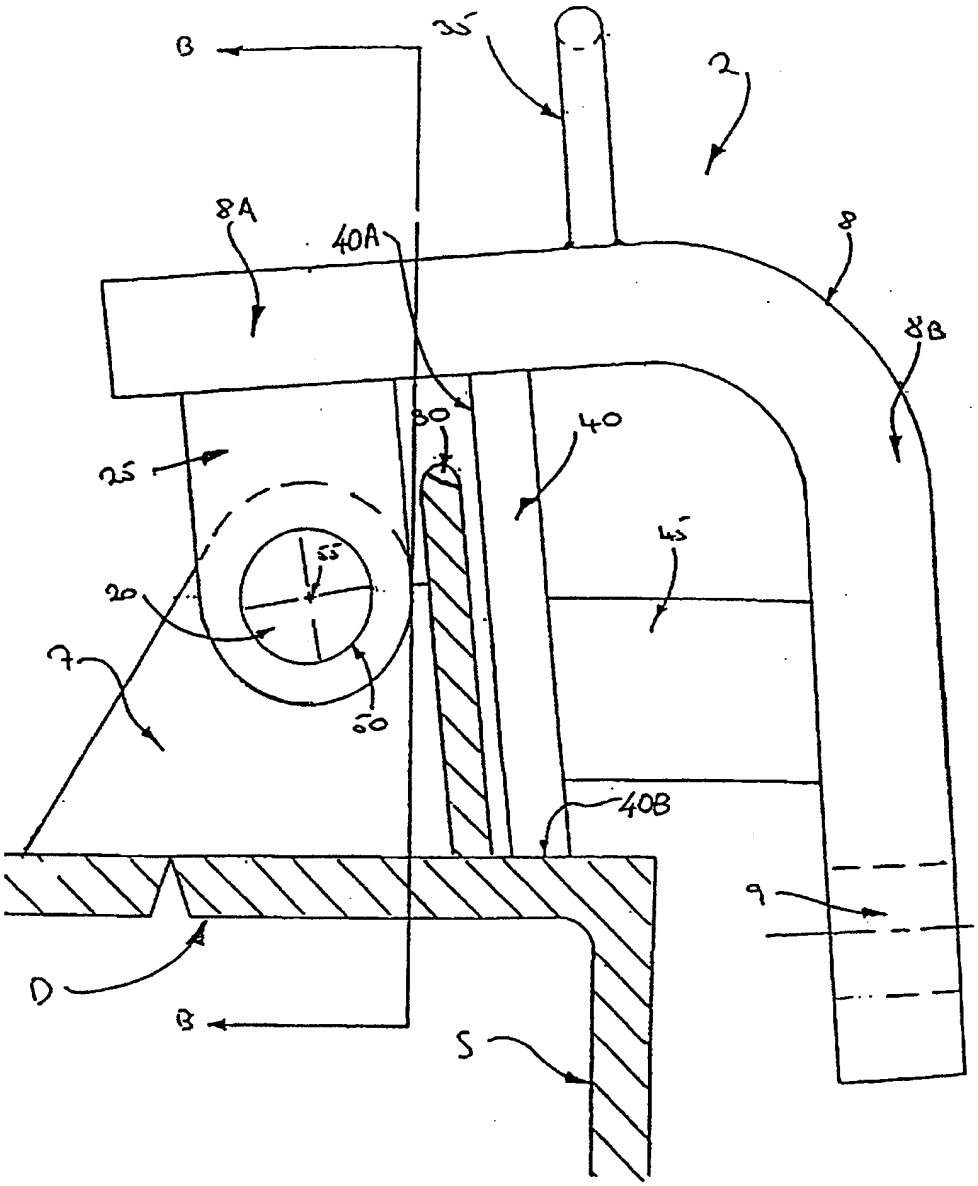


Fig.8

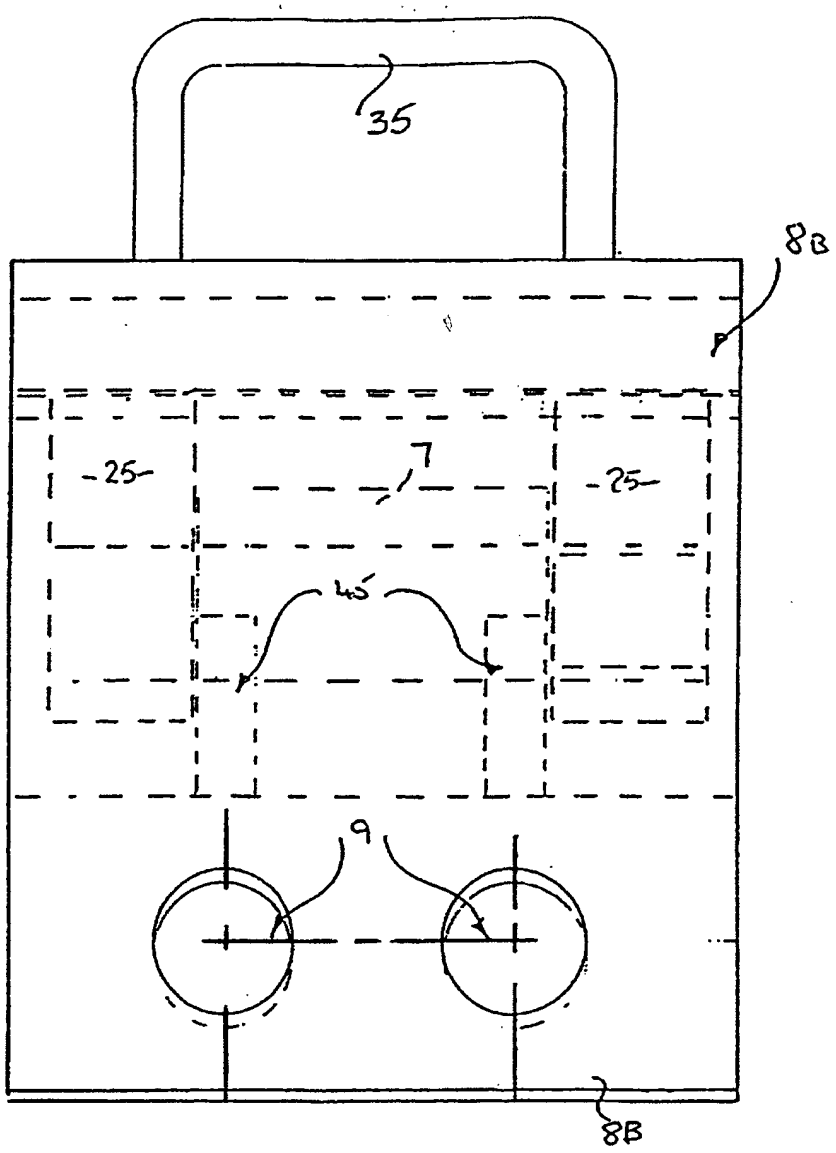


Fig.9

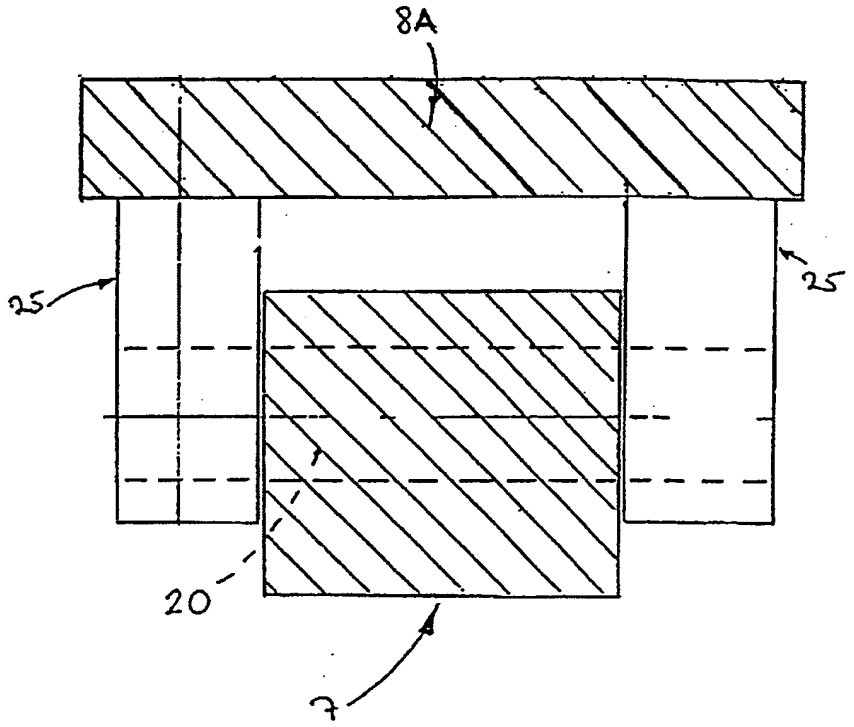


Fig.10

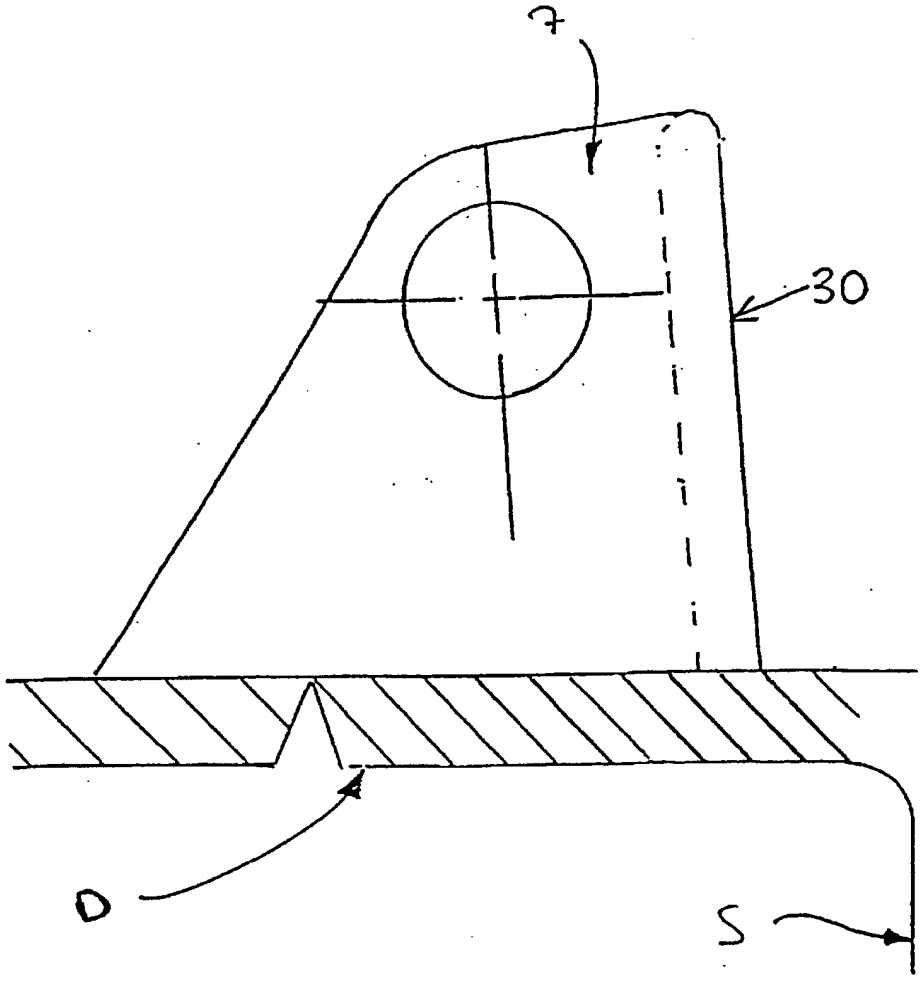


Fig.11

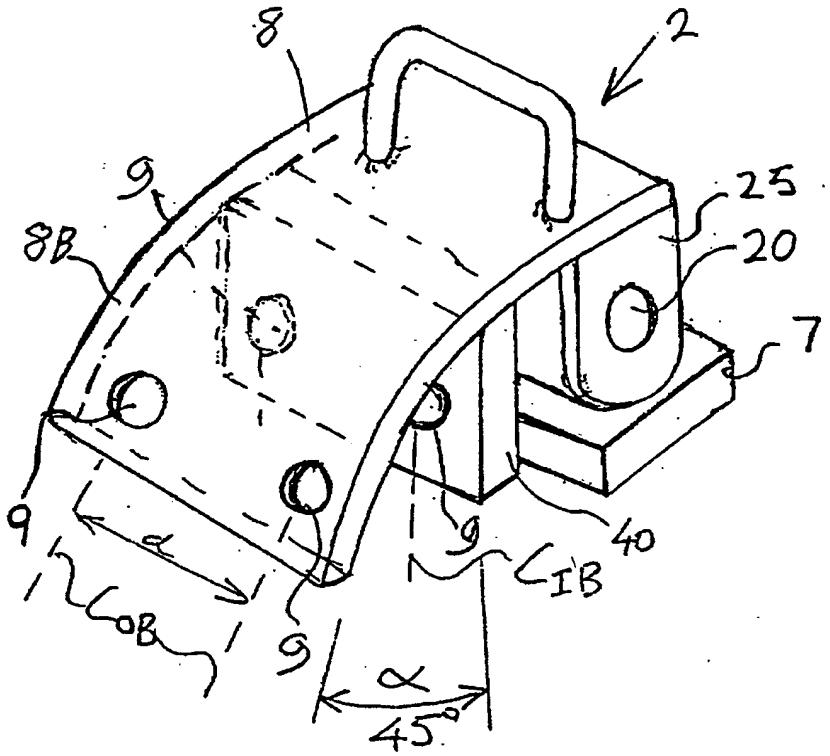


Fig.12

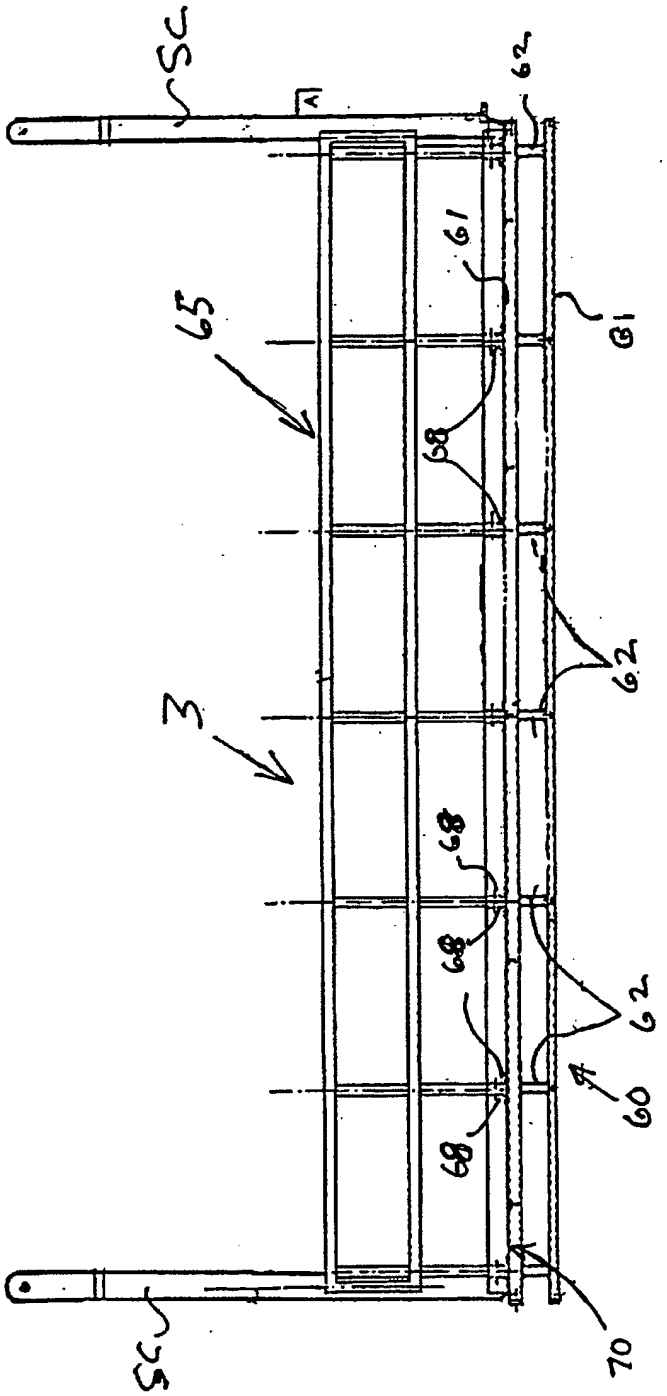


Fig.16A

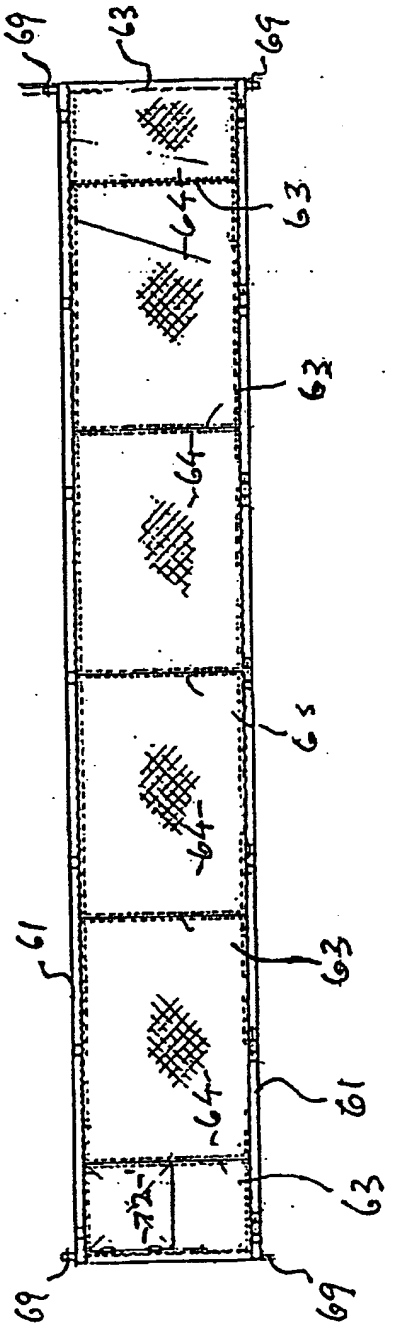


Fig.16B

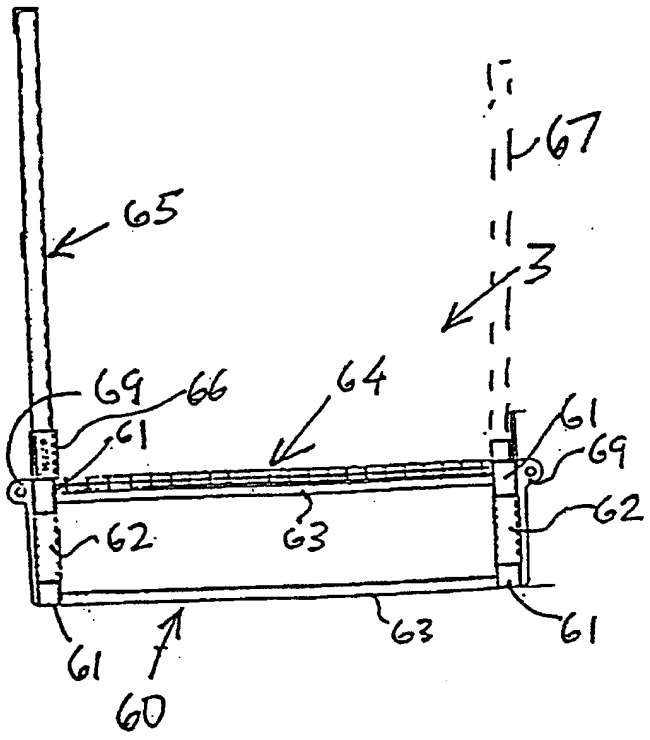


Fig.16C

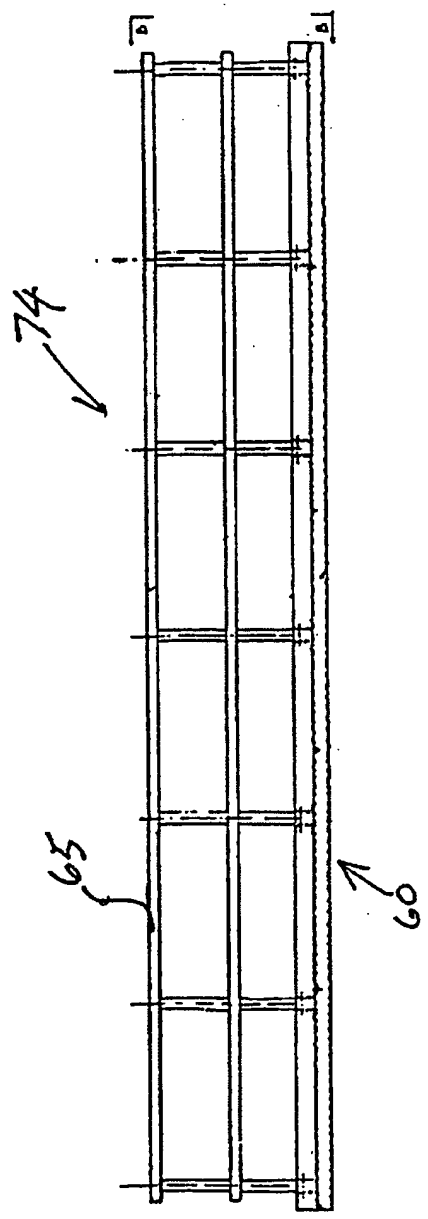
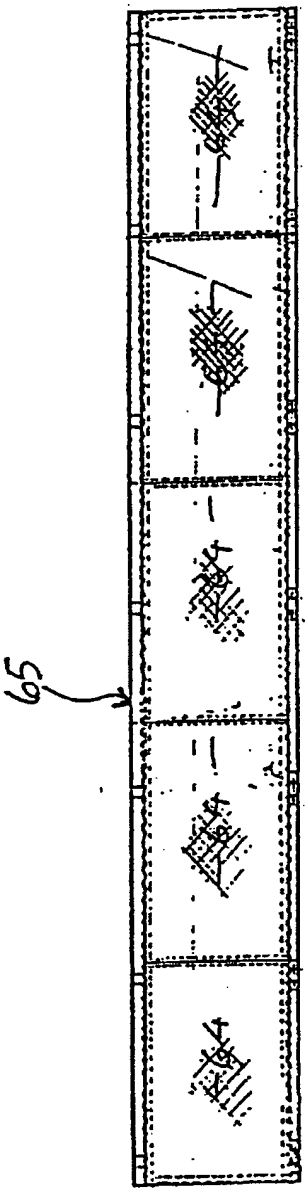


Fig.17A



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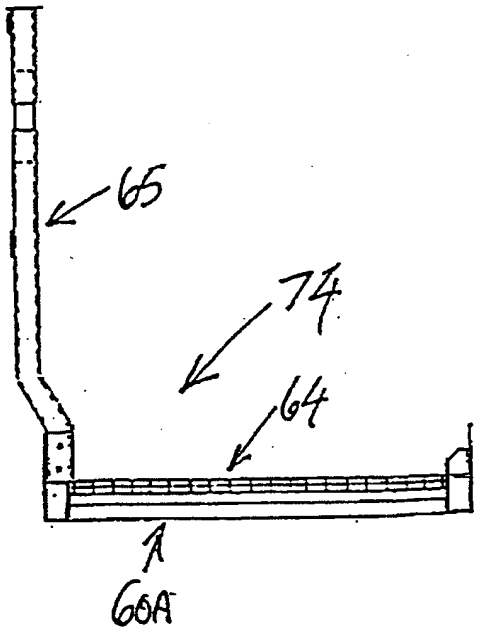


Fig.17C

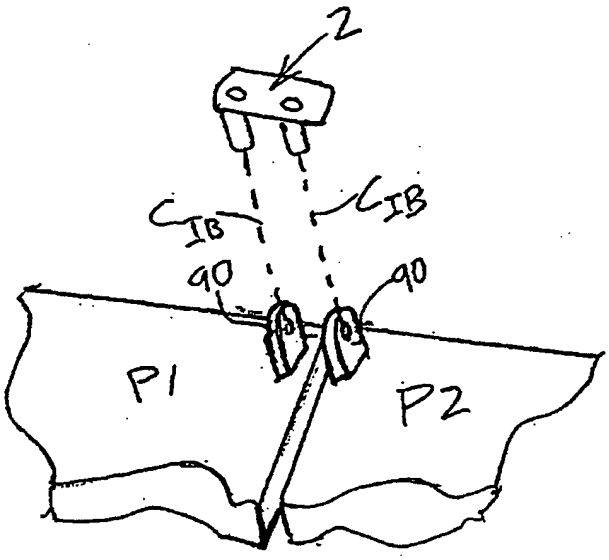


Fig.18

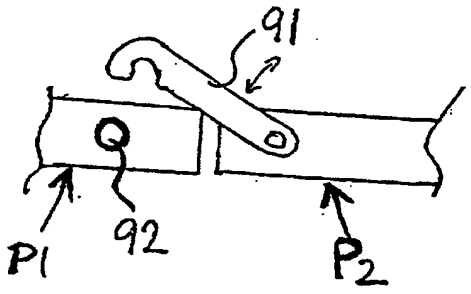


Fig.19

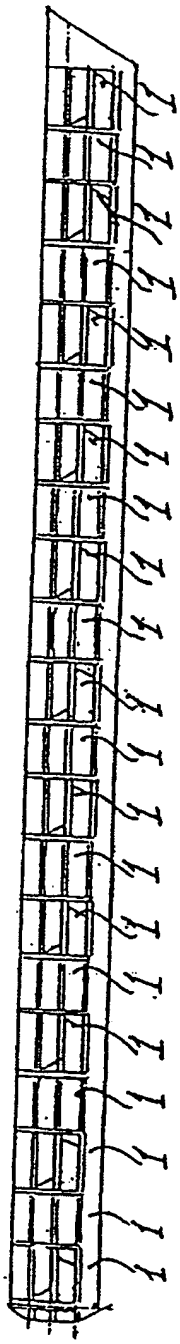
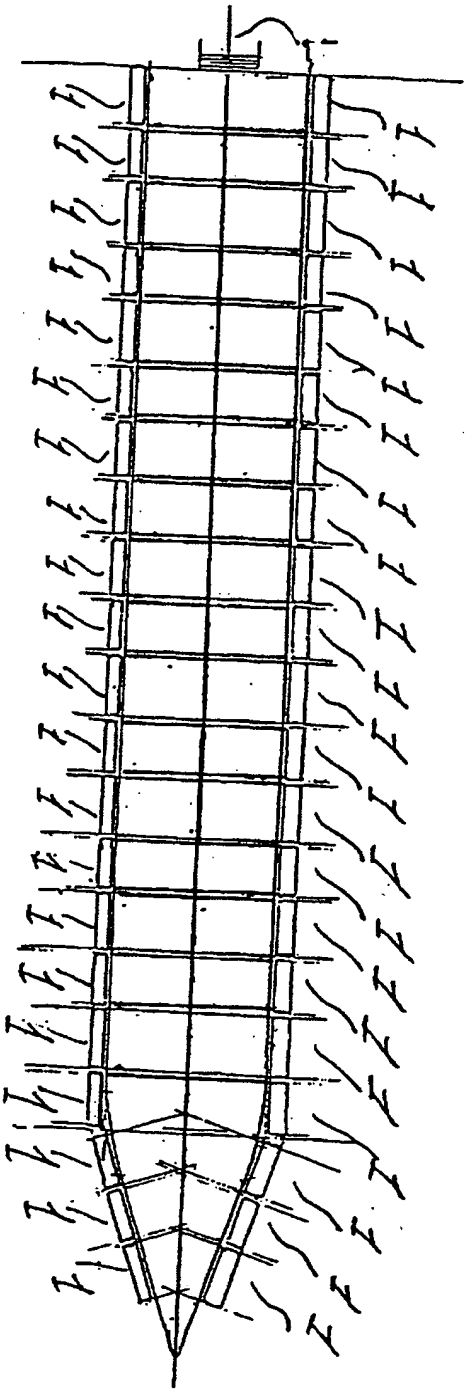


Fig.20A



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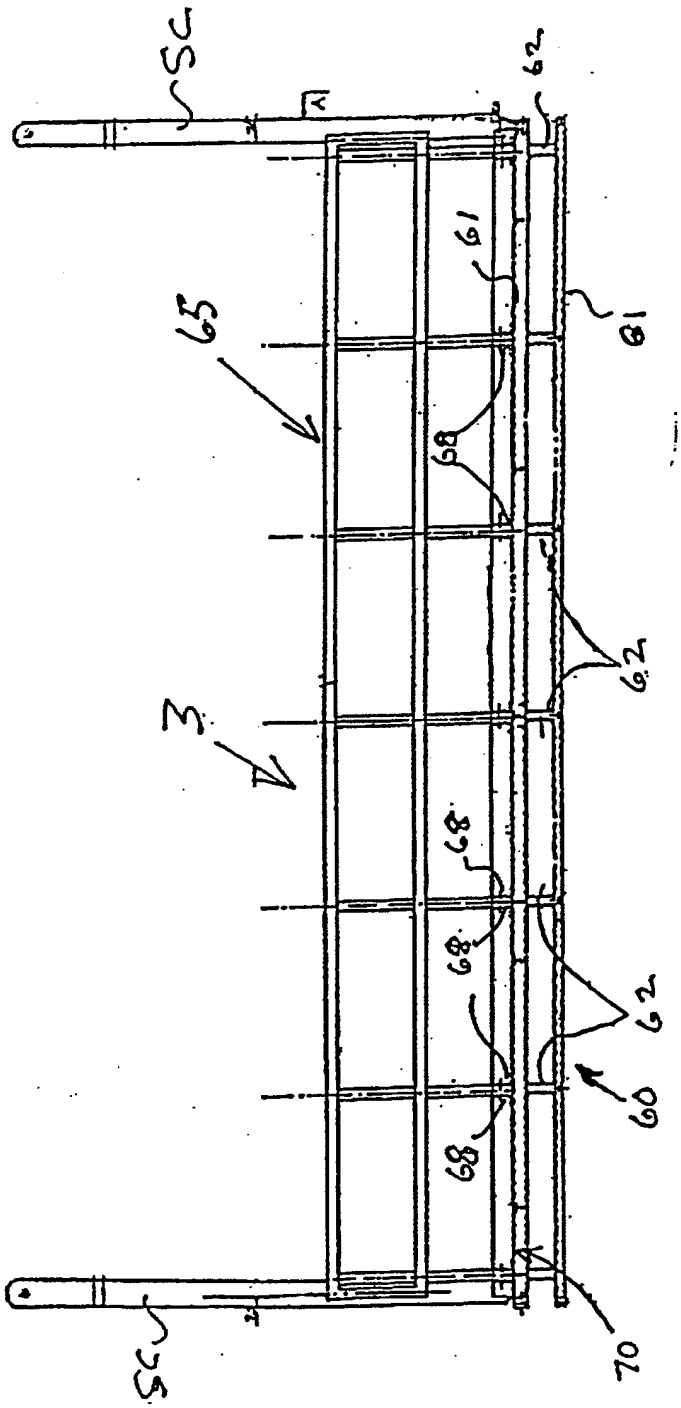
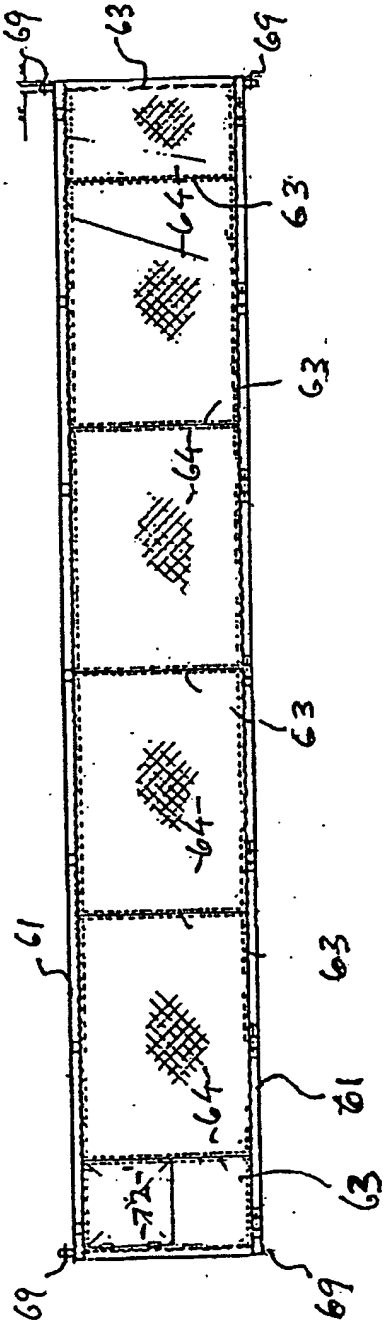


Fig.21A



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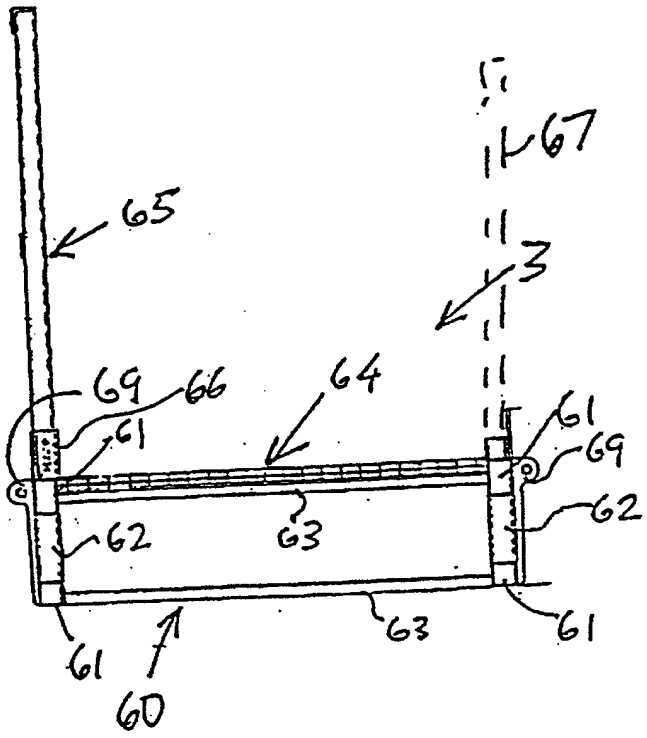

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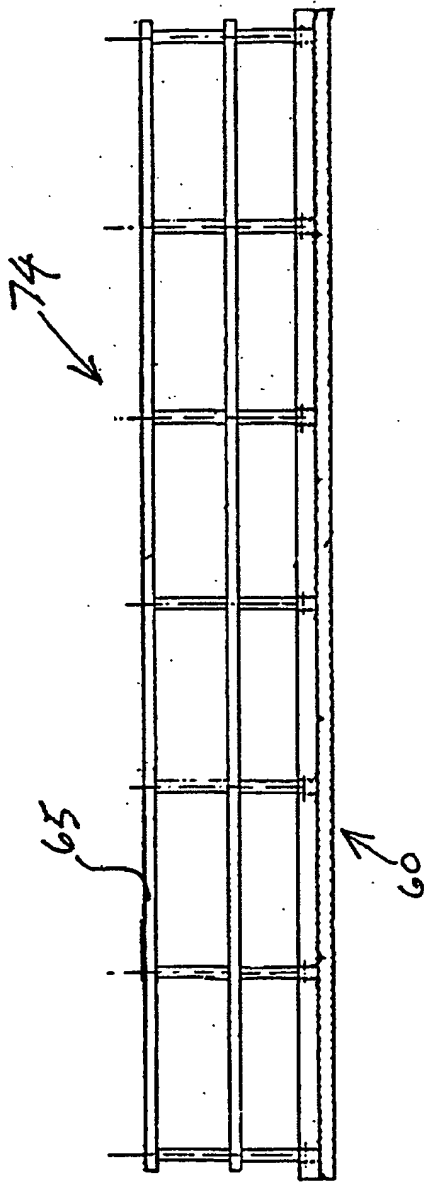

Fig.22A

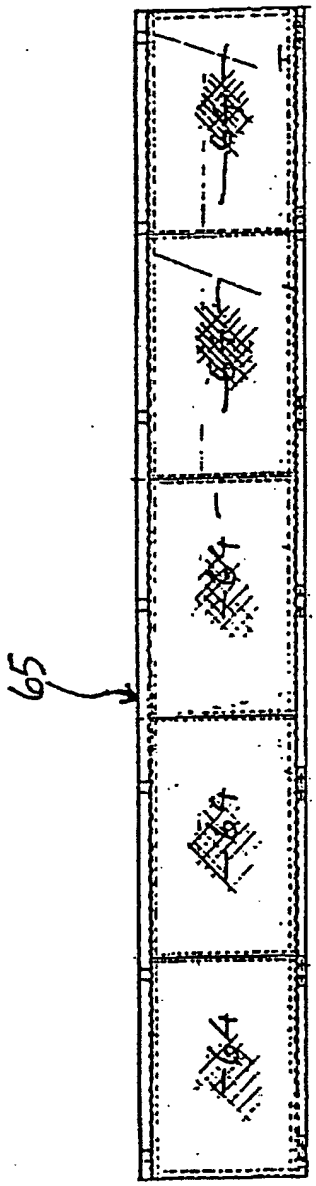

Fig.22B

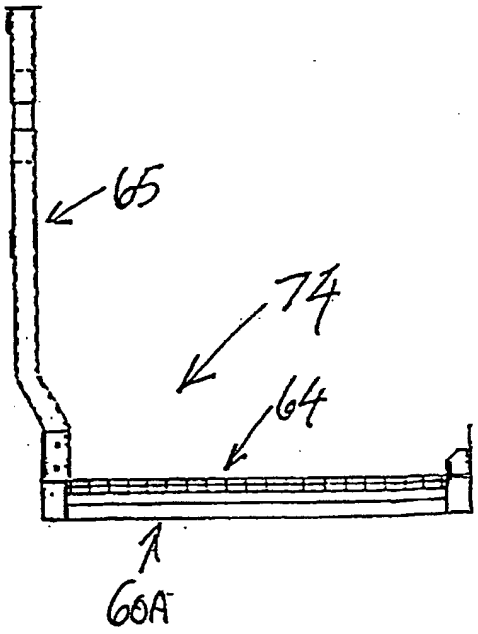

Fig.22C

"ACCESS SCAFFOLDING, SCAFFOLDING DEVICES AND METHOD"

The present invention relates to an access system in the form of scaffolding and especially to supporting and locating devices for use in scaffolding and also to a scaffolding method. The invention is particularly but not exclusively concerned with the installation of scaffolding at surface vessels.

In a prior art scaffolding system such as described in GB Patent Specification No. 1340487 for use at a workface of a structure, a series of platforms are connected to a set (four) of suspension chains by means of suitable chain connections with each chain joined to a corner of each platform, and the scaffolding system is placed in use by lifting the system via the topmost platform and suspending the system from carrying brackets welded or bolted to the workface e.g. ships' hull by means of suspender chains extending from the carrying brackets to the topmost platform whereby the scaffolding system is caused to be suspended by the side of the structure work face (hull) with the platforms in appropriately spaced vertical array. Any number of side-by-side platform arrays can be provided to give the desired cover over the workface area, with the platforms of one array preferably linked to the respective platforms of an adjacent array. To enable the system to lie alongside an inclined or curving workface of a structure, a series of auxiliary locating brackets have been welded or bolted to the structure at selected locations and the inner chains of the chain set were connected to these locating brackets to apply a certain contour to the system. Also, the platforms have been provided with telescopic transverse members which can be extended to engage the workface to improve the system contour. Due to practical and/or aesthetic requirements, it has been necessary to remove both the carrying brackets and the locating brackets after

work involving the scaffolding has been completed. This can be a time consuming and relatively expensive procedure and even after efforts to touch up the structure have been effected when the brackets have been removed unsightly blemishes may still remain.

It is the principal object of the present invention to obviate or mitigate this problem and especially to reduce both the erection time and removal time of a scaffolding system. Therefore according to a first aspect of the present invention a method of installing scaffolding at a vertically extending workface comprises supporting a scaffolding assembly including at least one platform coupled to carrying cable means, by upper support means; and locating the carrying cable means adjacent the side of said workface by means of at least one holding device attached to the workface by a self-contained force means in the device and without adaptation of the workface. Preferably said self contained force means is provided by having the holding device comprise a vacuum device or a magnetic device.

Preferably said upper support means includes a base member attached to an upper surface e.g. a ships' deck extending transversely to said workface, for example comprising a side of the ships' hull.

As a second aspect, the present invention is also a scaffolding cable holding device adapted for attachment to a workface by vacuum or magnetic effect, said device including means to hold a scaffolding platform support cable.

According to a third aspect of the present invention a support device is provided for a scaffolding assembly comprising at least one platform and a carrying cable means joined to said platform, the scaffolding assembly being located at the side of a workface for example at a ships' hull side; said support device comprising a base member for fixing to a surface e.g. a ship's deck, extending

transversely to said workface, and a carrying member received by said base member, said carrying member being adapted to overhang said workface and including means to receive said carrying cable means of the scaffolding assembly.

Preferably the base member is of channel form, while the carrying member preferably comprises a plate which is cranked in end-view, one arm of the cranked plate being received in said base member while the other arm overhangs the transverse surface and overlies a portion of said workface, said other arm including means for holding the scaffolding cable means.

Preferably fixing means are provided for releasably securing the carrying member in the base member.

In one embodiment the channel form base member has its channel extending transversely relative to the workface while in a second embodiment the channel extends substantially parallel to the workface.

In respect of the first embodiment, said one arm of the carrying member preferably extends through the base member with an end remote from the workface extending outwith the base member; preferably said end is also cranked, and this cranked end can co-operate with a shoe device for releasable securement of the carrying member in the base member. In respect of said second embodiment, the carrying member preferably comprises pair of plates having lateral portions which are placed in overlying relationship in the channel form base member for location of the carrying member. The plates can be secured by means of fixing screws.

In an alternative embodiment the carrying member is pinned to the base member, and preferably bearing or abutment means are

provided on the carrying member to arrest movement of the carrying member : the base member is preferably joined or integrated with a side plate member which may be engageable by the bearing means.

According to a further embodiment, the carrying member includes first receiving means to receive inner cable means of the scaffolding assembly and second receiving means to receive outer cable means of the assembly, said second receiving means being set at an angle relative to the first receiving means, for example at 45°.

According to a fourth aspect of the present invention scaffolding apparatus comprises a support device in accordance with the third invention aspect for suspending a scaffolding assembly, and a vacuum or magnetic operable holding device adapted for coupling to said scaffolding assembly whereby the scaffolding assembly can be made to lie adjacent a workface when the holding device is fixed to the workface by vacuum or magnetic effect.

The invention facilitates a side-by-side access platform arrangement, provided by side-by-side scaffolding assemblies with means preferably present to lock together adjacent platforms.

Alternatively platform carrying bridging sections can be provided to link adjacent scaffolding assemblies of the invention, and preferably the ends of the platform of the bridging section are received by the ends of the adjacent access platforms of scaffolding assemblies with an interfitting male/female relationship. To expedite this interfitting the platforms of the scaffolding assembly can have a base of open space frame form adapted to receive an end of a base potion of a bridging platform.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings wherein:-

Fig. 1A and 1B show schematically an end view and a front view respectively of a scaffolding assembly suspended at the side of a ship by an installation in accordance with the present invention;

Fig 1C shows the section A-A of Fig 1B.

Figs. 2 and 3 show respectively, to a larger scale, an end view and a front view (in direction of arrow A in Fig. 2) of the deck mounted support shown in Fig. 2, for the suspension of the scaffolding assembly;

Figs. 4, 5 and 6 illustrate a further embodiment of deck mounted support for the scaffolding assembly, these figures showing respectively an end view , a front view (in direction of arrow A in Fig. 4) and a plan view of the support.

Fig 7 shows a side elevation of a scaffolding device in accordance with a further embodiment of the present invention attached to a vessel with deck edge plates;

Fig 8 shows a side elevation of an alternative embodiment of the present invention adapted to accommodate an alternative deck edge plate configuration;

Fig 9 shows a view of the carrying member indicated by arrow A on Figure 7;

Fig 10 shows section B-B on Figure 9;

Fig 11 shows a representation of an alternative base member; and

Fig 12 shows a pictorial view of a further example of a support for scaffolding;

Figs 13A and 13B show respectively plan and end views of a further embodiment of the present invention;

Figs 14A and 14B Fig 13 show respectively end and plan views of an alternative embodiment of the present invention adapted to accommodate a deck plate of variable width;

Figs 15A and 15B show respectively, an end view and a plan view of an alternative embodiment of the deck mounted support shown in Figs 2 and 3;

Figs 16A and 16B show end and plan views of a deck clamps in accordance with the present invention adapted for use on a plate wall;

Figs 17A and 17B show respectively end and plan views of a deck clamp adapted for a self aligning link device;

Fig 18 shows the provision of brackets on side-by-side scaffolding platforms to receive cables from the scaffolding support, at the ship's deck.

Fig 19 shows a link device for linking adjacent platforms;

Figs 20A and 20B show respectively schematic side and plan views of a ship with the scaffolding assemblies installed.

Fig 21A, shows a front view of an alternative design of access platform for the scaffolding assembly; while Fig 21B is a plan view of the platform and Fig 21C and end view.

Figs 22A to 22C show similar views as in Figs 21A to 21C but for a bridging platform for the access platform of Figs 21A-C.

Referring firstly to Figures 1A to 1C, a scaffolding assembly 1 is suspended at the side S of a ship's hull by bracket form supports shown schematically at 2 (only one shown in Fig 1) fixed to the deck D of the ship. The scaffolding assembly 1 comprises a series of access platforms 3 carried by suspension cable pairs C_I and C_O in this example is the form of polyester suspension slings so that in use the platforms 3 form a vertical array, suitable connector elements 4 being provided on each platform 3 to enable the cables C_I and C_O to be coupled to the platform. When purely suspended from the support 2, the assembly 1 lies vertically and to enable the platforms to be fitted to the side S of the ship, the inner cables C_I are joined at appropriate locations to locating devices 5 which are adapted for clamping to the ship's side by vacuum or magnetic effect, whereby the platforms 3 can be pulled into the line of the ship's hull especially for example if the side S of the ship has parts inclined from the vertical, the devices 5 including suitable connectors 6 for receiving the cables C_I. As will be appreciated the devices 5 can be secured to the ship's side S without any need for adaptation of the ship's side, especially the need to weld coupling cleats or brackets to the ship's side. To assist in holding the scaffolding assembly against the ship's side, an anchor strop or tie strap AS_1, can extend under the ship's hull and be secured at its ends to the lowermost platforms of scaffolding systems on each side of the hull (i.e. as in Fig 15B) or alternatively, especially when only the one scaffolding assembly is present, the strop AS_1, can be secured to a ground anchor for example on a dry dock floor. As a further alternative, the assembly can be anchored at its bottom end by a strop AS_2 again having one end secured to the lowermost platform but in this case with the other end secured to the ship's side by a vacuum or magnetic anchor device 5A.

The support 2 in Fig 1A is represented in a general way and Figs. 2 and 3 show a support 2 suitable for the scaffolding 1 in greater detail, their support 2 comprising a base member 7 of pressed channel form which is welded to the ship's deck D closely adjacent the side S, and a plate form carrying member 8 received by the base member 7, the channel of the member 7 extending laterally relative to ship's side in this embodiment to permit appropriate fitting of the member 8. As can be seen in Fig. 2, the member 8 is of cranked form in end view, with a first arm 8A being received in the base member 7 while a second arm 8B extends vertically in use overhanging the ship's side and includes an eye 9 to receive a shackle device 2A for coupling of the cables C_O and C_I to the support. The arm 8A has its end remote from the arm 8A of bent up form 8C. In use, the end 8C is located outwith the base member 7 and the member 8 is secured to the base member 7 by means of a loose shoe 10 having a top surface shaped complementary to the arm 8A and a leg 10A extending through the channel member 7, the shoe 10 can be joined to the member 8 by a screw 11 fitted say at the part 8C. When the shoe 10 is removed, the member 8 can be easily slid away from the base member 7. Whilst the channel supports 7 could be removed when operations involving the scaffolding are complete it is a definite intention of this invention that these supports 7 will remain in place. It is contended that these members 7 will not constitute any real "nuisance" factor bearing in mind that other scantling are usually present at the ship's side, for example stancheons, bollards, fairleads etc. They can be stood on so that standing space is not reduced. and they will be relatively inconspicuous. Two spaced supports 2 would be used with each scaffolding assembly 1.

The support 2 shown in the embodiment of Fig. 4-6 again utilises a channel form base member 7 but in this case the channel

extends generally parallel to the ship's side. The carrying member 8 comprises a pair of plates 12, 13 each cranked 8A, 8B in end view as before. The arms 8A of the plates 12, 13 carry lateral portions 12A, 13A adapted to extend through the channel member 7 in overlying relationship, and in use the plates 12, 13 are held in position by screws 14. A further shoe 15 is provided for proper positioning of the plates 12, 13. Again the member 8 can be easily removed leaving only the base member 7 welded to the deck D.

The supports 2 of the two embodiments are preferably made of steel and the scaffolding assembly 1 will be of suitable material. Thus the platforms 3 could be of steel construction with the cables C_I, C_O comprising steel chain cable as is conventional. However, other materials such as aluminium or glass reinforced plastics material (G.R.P), could be used in the manufacture of the platform 3 and synthetic material e.g. in rope or sling form could be used for the cables, all leading to a substantial saving in weight in the assembly.

Flame retardant sleeve slings SC, for example of polyester material for the cables C_I and C_O can be used. Thus a set of slings SC (four) can be permanently attached to each platform 3, with the slings having means to enable their releasable connection to an adjacent platform for the provision of the vertical array of suspended platforms. The platforms 3 can be arranged to be stackable one above the other when not in use, while, as an initial step to place the platforms in use, the top platform of the stack can be raised by a crane joined to the upper platform by upper cable portions C_{IB}, C_{OB} causing the whole platform array to open out (as shown in Fig 1A), with the desired spacing between the platforms 3 being achieved via the location of the cables C_I and C_O. The cables C_I, and C_O could be of other materials for example a combination of steel chain and synthetic rope/sling could be used for the cables C_I C_O. In

particular, the upper bridle cable parts C_{IB}, C_{OB} linking the top platform 3 to the supports 2 via shackle 2A could be separate link chains with the remainder of the cables of synthetic material. By having quick release chain couplings on the top platform 3 the length of link chains can be quickly adjusted as necessary. As the lower cable portions swing generally in parallelogram manner the need for rapid adjustment in this part may not be so significant.

The use of G.R.P. for the platforms 3 is particularly beneficial, especially as it provides the additional advantages of being corrosion resistant, non magnetic, non electrical conductive, dimensionally stable (+70° /- 20°C) and weld shatterproof. Further, the material leads to low maintenance requirements for the platforms and enables the platforms to have an acceptable fire retardant property, while having high strength and easy assembly.

The scaffolding assembly 1 can be stored in a stacked condition in readiness for immediate use. To place the assembly in use, a predetermined number of the interconnected platforms 3 are raised from the stacked condition by a crane, as above described, and as the assembly is lifted, via the top platform, by the crane, the assembly opens out to form a string of platforms 3 with a desired spacing e.g. 2 metres between the levels of successive platforms. The opened assembly is then offered to the side S of the ships hull and the top load bearing platform 3 is secured by attachment to the two bracket supports 2 at the hull deck D, say via shackles 2A for the Figs 2/3 support. Once the top load bearing platform is secured the crane can be removed. The assembly 1 can then be applied to the contour of the ship side S as shown in Fig 1A.

Conveniently each or a selected platform can include an access hatch 70 with an openable cover 72 and movement between the

platform levels can be achieved by in-built collapsible ladders 73 via the hatches 70. The guard rails 65, of a foldaway type facilitate platform stacking.

Appropriate levelling of the platforms 3 may also be achieved by means of turnbuckles 75 at the top end of the cables portions C_{OB} as shown in Fig 1A. Further, the platform 3 can include adjustable buffers to engage the ships side.

Referring now to the embodiment shown in Figs 7 and 9 there is shown a scaffolding support device 2 comprising a base member 7 which is welded to a ships' deck D closely adjacent to the side S, and a plate carrying member 8 received by the base member 7. The ship's side also incorporates a deck plate 30 which extends above the level of the deck D. As can be seen in Fig 7 the member 8 is of cranked form with the first arm 8A being received by the base member 7 while the second arm 8B extends vertically, in use overhanging the ships' side S and includes at least one eye 9 to receive a shackle device (not shown) to support 2. Carrying member 8 is also provided with a bearing plate 40 which extends at an angle substantially equal to that of the ships side S from the underside of arm 8A. Said plate 40 is rigidly attached to arm 8B by means of two reinforcing members 45. Arm 8B is provided with two members 25 extending vertically from its underside. Said members 25 are spaced at a distance substantially equal to the width of the base member 7 and incorporate circular apertures similar to that provided in base member 7.

In use carrying member 8 is attached to base member 7 by means of a pin 20. This connection allows the carrying member 8 to rotate about the longitudinal axis 55 of the pin 20 extending through the circular apertures in the base member 7 and in the members 25. Carrying member 8 can be rotated about said axis until bearing plate

40 comes into contact with deck plate 30 and the ships' side S as shown in Fig 8. In the deck mounting of the previous embodiment when loading is applied to the support 2 via apparatus suspended from eye 9, arm 8b may tend to bend towards the ships' side S creating stress concentrations in the material of member 8. Repeated loading and unloading could possibly lead to the propagation of cracks and ultimately lead to the failure of the carrying member 8.

The provision of reinforcing members 45 and bearing plate 40 serve to reduce the deformation experienced by carrying member 8. Loading applied at eye 9 is transferred to bearing plate 40 by reinforcing members 45 whereupon it is distributed over the contact patch between the inner face 40A of said plate 40 and the ships' side S and deck plate 30. Carrying member 8 is restrained from bending by the resistance of reinforcing members 45 to deform under compressive loading.

Referring now to Fig 8 there is shown a scaffolding support device 2 installed on a vessel where the deck edge plate 30 does not extend along the same plane as the ships' side S and will not be as strong as the plate 30 of Fig 7. The support 2 is again comprised of a base member 7, a carrying member 8 and operates substantially as described hereinbefore. However in this embodiment contact is made between the lower surface 40B of the bearing plate 40 and the ships deck D so as to be free of the plate 30. As before, in use, reinforcing members 45 are present on carrying member 8.

Installation of the scaffolding assembly 1 utilising the scaffolding support devices 2 of Figs 7 and 8 can be achieved exactly similarly as for the previous embodiments.

Fig 12 shows a further form of support 2 in accordance with the present invention. The support 2 of Fig 12 is similar to the support

shown in Fig 7 and again has lugs 25 extending from a carrying member 8 whereby the carrying member 8 is pivotally connected to a base member 7 by a pin 20, the base member 7 again being secured to the ship's deck D e.g. by welding. A significant difference is that the leading limb 8B of the Fig 12 support is inclined at an angle α relative to the reinforcing plate 40, in comparison with Fig7. Preferably this angle α is 45° approximately. Also, the plate 40 can be arranged to receive shackles for the scaffolding cables C_{IB} via holes 9 on the plate 40, while the holes 9 on the limb 8 serve to receive shackles for the cable parts C_{OB}. The different angling of the limb 8B and the plate 40 serves to encourage more satisfactory load transfer from the cable parts C_{IB} and C_{OB} to the support 2, especially by minimising bending moment on the limb 8B. The holes 9 on each of the limb 8b and plate 40 can be appropriately spaced (d) e.g. by 160mm.

Other alternative forms of support device 2 in accordance with the present invention are shown in Figures 13A to 17B. The support 2 shown in Figures 13A and 13B is similar to the support shown in Figs 7 and 8 and operates substantially as described hereinbefore. However, the main difference is that the leading surface 8B of the support 2 shown in Figure 13A and 13B is inclined at an angle of 30° relative to the vertical axis of the shackle for the scaffolding cables hanging from the reinforcing member 45 in comparison with Fig 8. This angle, and the extended reinforcing member 45, minimise the bending moments of the limb 8B created during load transfer from the cables to the support 2. Additionally, the link for connecting to the cable C_{OB} can be connected to the holes 9 while the cable C_{IB} can be connected to the shackle attached to the extended reinforcing member 45.

Figures 14A and 14B show a variation on the embodiment shown in Figs 7, 8 and 13A and 13B. In this embodiment, a deck clamp for use during rig maintenance, for example, is shown. Again, this shows a limb 8B at an angle of 30° relative to the vertical axis of the shackle attached to the extended reinforcing member 45. However, the limb 8 is connected to a rectangular thrust plate 100, arranged vertically to the deck D, which in turn is connected to a rectangular clamping plate 110 by means of two guide pins 120. These pins 120 are fixed in the central portion of the thrust plate 100 and clamping plate 110. The clamping plate 110 is generally parallel with the vertical axis of the thrust plate 100. The thrust plate 100 also contains two threaded portions 130 at opposite ends for receiving locking screws 140. In use, the two locking screws 140 adjust the position of the clamping plate 110 until it is secured against a kick plate 150. The kick plate 150 is a generally rectangular piece of plate which is welded to the deck of the rig D and varies in thickness, hence the need for an adjustable clamping assembly. The deck clamp is secured to the kick plate 150 when the clamping plate 110 and a second thrust plate 160 are clamped onto opposite faces of the kick plate 150. This locks the clamping plate 110 in position and prevents any rotation of the deck clamp. The assembly is housed within two plates 170 which enclose either end of the limb 8B.

Figures 15A and 15B show an alternative to Figures 2 and 3 in that two holes 9 are provided instead of one. This provides a two-hole suspension arrangement for platform-to-platform assemblies.

Figures 16A and 16B shows a deck clamp which can be used on submarine fabrication, for example. This clamp comprises three generally triangular plates 180 connected by two rods 190 inserted through apertures 200 in each plate 180 and welded. The apertures 200 are at opposite ends of the triangular plate 180 and share a

central horizontal axis. Each plate 180 also has a generally rectangular recess 210 which extends from the horizontal edge 220 parallel to the horizontal axis of the apertures 200 to the centre of the plate 180. This recess 210 can be sized to suit the plate thickness of the walls of the submarine. In use, the recess 210 locates on the plate wall allowing the remainder of the deck clamp to have a portion on either side of the plate wall. This allows platforms to be hung on the external or the internal sections of the submarine. Links 230 are attached to each enclosed portion of the rods 190.

Figures 17A and 17B show an alternative deck clamp comprising a recessed base member 240 welded to the deck surface D with an aperture 250 throughout for receiving a securing pin 260. A carrying member 270, comprising three pieces of angle plate 280 connected together by the securing pin 260, is connected pivotally to the base member 240 by inserting the pin 260 through the apertures 250 in the base member 240 and corresponding apertures in the carrying member 270 and welded. Unlike previous alternatives, which had an angled limb 8B with a hole 9 for receiving shackles, this clamp attaches the shackles 290 onto the securing pin 260 whereby the shackles become self-adjusting and do not involve any rotation of the deck clamp.

Fig 18 shows inner portions of two adjacent platforms P1, P2 e.g. the platform arrangement in Figs 20A/B as they are supported from a common support 2 at the ships deck, specifically by the cable parts C_{IB}, this support 2 for example being in accordance with the support of Fig 12. For this purpose lugs 90 are located appropriately on the platform P1, P2, and similar lugs can be present on the outer portions of the platforms to receive the outer cable parts C_{OB} linked to the support 2. Fig 19 shows a pivotal device 91 on one platform e.g.

platform P2 swingable to engage with a pin 92 on the other platform (P1) for locking together of two adjacent platforms (P1, P2).

Figs 21A to 21C show an alternative platform design of relative light weight, having a base 60 of space-frame form comprising longitudinal members 61, struts 62 and T-section cross bars 63. The members 61, struts 62 and cross bars 63 are of aluminium material. The platform floor 64 is of G.R.P. chequered plate or grating of the DURADECK® type and can comprise a series of individual sections for convenience of assembly and storage, while a rear railing 65 is fitted to the base 60, being bolted to flanges 66 at each end of the base 60. Additionally stanchions 67 of railings 65 are foldably fitted to the base via angle plates 68 at the rear edge of the base 60. The railing 65 is preferably formed from G.R.P. tubing. The lugs 69 to receive the platform carrying chains or slings are shown.

Where large hull lengths have to be covered, inter-linking bridging sections can be employed between adjacent scaffolding assemblies 1 although the arrangement of Fig 18 using side-by-side platforms should be easier to install and remove. A suitable platform 74 for an inter-linking bridging section BS is shown in Figs 22A to 22C and this can be generally similar in construction to the platform 3 of Figs 21A to 21C, although platform 74 will be narrower (see Fig 22B). Further the base 60A of the platform 74 is shallower than the base 60 of access platform 3 so enabling the ends of the base 60A to fit into the space-frame bases 60 of adjacent platforms 3 in male/female relationship when the bridging section BS is located for use.

Scaffolding arrangements as above described in accordance with the present invention enable scaffolding erection at relatively low cost. The arrangement enables an increase/decrease in scaffolding coverage

very quickly, on site. As all key parts are structurally integrated, loss of such parts and loose nuts and bolts can be avoided. The lightweight stackable platform units reduce storage and transport costs, and where GRP is employed can be corrosion resistant (thereby needing virtually no maintenance).

The embodiments of the invention described hereinbefore are given by way of example only and are not meant to limit the scope of the invention in any way. Indeed it will be apparent to anyone skilled in this particular art that the relative dimensions of the components of the invention can be varied to accommodate a wide range of deck edge plate 30 positions and angles. The base member 7 could be used in the support of other structures when not in use for scaffolding support.

Claims

1. Method of installing scaffolding at a vertically extending workface comprising supporting a scaffolding assembly including at least one platform coupled to carrying cable means, by upper support means; and locating the carrying cable means adjacent the side of said workface by means of at least one holding device attached to the workface by a self-contained force means in the device and without adaptation of the workface.

2. The method as claimed in claim 1, wherein said self contained force means is provided by having the holding device comprise a vacuum device.

3. The method as claimed in claim 1, wherein said self-contained force means is provided by having the holding device in the form of a magnetic device

4. The method as claimed in any preceding claim, wherein said upper support means includes a base member attached to an upper surface extending transversely to said work-face.

5. A scaffolding cable holding device adapted for attachment to a work-face by vacuum or magnetic effect, said device including means to hold a scaffolding platform support cable.

6. A support device is provided for a scaffolding assembly comprising at least one platform and a carrying cable means joined to said platform, the scaffolding assembly being located at the side of a work-face; said support device comprising a base member for fixing to a surface, extending transversely to said work-face, and a carrying

member received by said base member, said carrying member being adapted to overhang said work-face and including means to receive said carrying cable means of the scaffolding assembly.

7. The support device as claimed in claim 6, wherein the base member is of channel form, while the carrying member preferably comprises a plate which is cranked in end-view, one arm of the cranked plate being received in said base member while the other arm overhangs the transverse surface and overlies a portion of said workface, said other arm including means for holding the scaffolding cable means.

8. The support device as claimed in claims 6 or 7, wherein fixing means are provided for releasably securing the carrying member in the base member.

9. The support device as claimed in any of claim 6 to 8, wherein the channel form base member has its channel extending transversely relative to the workface.

10. The support device as claimed in any of claim 6 to 8, wherein the channel extends substantially parallel to the workface.

11. The support device as claimed in claim 9, wherein said one arm of the carrying member extends through the base member with an end remote from the workface extending outwith the base member.

12. The support device as claimed in claim 11, wherein in said end is also cranked, and this cranked end can co-operate with a shoe device for releasable securement of the carrying member in the base member.

13. The support device as claimed in claim 10, wherein the carrying member preferably comprises pair of plates having lateral portions which are placed in overlying relationship in the channel form base member for location of the carrying member.

14. The support device as claimed in claim 13, wherein the plates are secured by means of fixing screws.

15. The support device as claimed in claim 6, wherein the carrying member is pinned to the base member, and preferably bearing or abutment means are provided on the carrying member to arrest movement of the carrying member.

16. The support device as claimed in claim 15, wherein the base member is joined or integrated with a side plate member which is engageable by the bearing means.

17. The support device as claimed in claim 6, wherein the carrying member includes first receiving means to receive inner cable means of the scaffolding assembly and second receiving means to receive outer cable means of the assembly, said second receiving means being set at an angle relative to the first receiving means.

18. Scaffolding apparatus comprising a support device in accordance with claim 6 for suspending a scaffolding assembly, and a vacuum or magnetic operable holding device adapted for coupling to said scaffolding assembly whereby the scaffolding assembly can be made to lie adjacent a workface when the holding device is fixed to the workface by vacuum or magnetic effect.

19. Scaffolding apparatus as claimed in claim 18, wherein platform carrying bridging sections are provided to link adjacent scaffolding assemblies of the invention, and preferably the ends of the platform of the bridging section are received by the ends of the adjacent platform of scaffolding assemblies with an interfitting male/female relationship.

20. Scaffolding apparatus as claimed in claim 19, wherein the platforms of the scaffolding assembly have a base of open space frame form adapted to receive an end of a base portion of a bridging platform.

Application No: GB 0009326.0 **Examiner:** Guy Robinson
Claims searched: 1 to 4 **Date of search:** 10 October 2000

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): E1S SM

Int Cl (Ed.7): E04G 3/10

Other: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	FR2669361	(MARTEAU) whole document	1, 2 & 4
X	JP11078869	(GIJUTSU) abstract and figs	1, 3 & 4
X	JP7324479	(HONSYU) abstract and figs	1, 3 & 4
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